

Claim 1

A motion picture electronic watermark system, for embedding information in frames, comprising:

- (1) means for preparing information to be embedded as bits in a bit stream;
- (2) means for alternating the signs of said bit stream in accordance with a sign inversion cycle; and
- (3) means for embedding said bit stream in said frames.

Claim 2

The motion picture electronic watermark system according to claim 1, wherein said means (2) includes means for adding sign bits to said bit stream.

Claim 3

A motion picture electronic watermark detection system, for employing statistical observation of frames to detect embedded information, comprising:

- (1) means for accumulating values through observation of frames;
- (2) means for comparing the accumulated values through observation with threshold values that vary in accordance with said accumulated values; and
- (3) means for employing the comparison results to detect said embedded information.

Claim 4

The motion picture electronic watermark detection system according to claim 3, wherein said means (1) normalizes the values through observation of frames and accumulates the normalized values.

Claim 5

The motion picture electronic watermark detection system according to claim 3, wherein before accumulating said values obtained through observation of said frames, said means (1) changes the signs of said values.

Claim 6

The motion picture electronic watermark detection system according to claim 3, wherein at intervals of half a sign inversion cycle, said means (1) inverts the signs of said values obtained through observation of frames and accumulates the sign inverted values.

Claim 7

The motion picture electronic watermark detection system according to claim 3, wherein at intervals of one quarter of said sign inversion cycle, said means (1) stores all values obtained through observation of frames in two accumulators A and B in the order addition for A, addition for B, subtraction for A and subtraction for B.

Claim 8

The motion picture electronic watermark detection system according to claim 3, wherein said means (1) prepares two accumulators A and B, and accumulates values obtained by

observation of frames in said accumulator A at intervals of one quarter of said sign inversion cycle, in the order addition for A, addition for A, subtraction for A and subtraction for A, and in parallel to this process, accumulates values obtained by observation of frames in said accumulator B in the order addition for B, subtraction for B, subtraction for B and addition for B.

Claim 9

The motion picture electronic watermark detection system according to claim 7 or 8, further comprising means for, when a bias exists in the signs of values accumulated in said two accumulators, providing an upper limit for said bias.

Claim 10

A motion picture electronic watermark method, for embedding information in frames, comprising the steps of:

- (1) preparing information to be embedded as bits in a bit stream;
- (2) alternating the signs of said bit stream in accordance with a sign inversion cycle; and
- (3) embedding said bit stream in said frames.

Claim 11

A motion picture electronic watermark detection method, for employing statistical observation of frames to detect embedded information, comprising the steps of:

- (1) accumulating values through observation of frames;
- (2) comparing the accumulated values through observation with threshold values that vary in accordance with said

accumulated values; and

(3) employing the comparison results to detect said embedded information.

Claim 12

A recording medium for storing a motion picture electronic watermark detection program, for employing statistical observation of frames to detect embedded information, said program comprising:

- (1) a function for accumulating values through observation of frames;
- (2) a function for comparing the accumulated values through observation with threshold values that vary in accordance with said accumulated values; and
- (3) a function for employing the comparison results to detect said embedded information.

Claim 13

A DVD system, which includes a motor for rotating a disk, a pickup for reading and writing a signal on said disk, a drive circuit for controlling said motor and said pickup, a DVD control block for issuing a command to said drive circuit, a decoding block for performing signal conversion and error correction, an electronic watermark control block for embedding information or detecting embedded information, and an interface unit for communicating with an external device, said electronic watermark control block comprising:

- (1) means for preparing information to be embedded as bits in a bit stream;
- (2) means for alternating the signs of said bit stream in

accordance with a sign inversion cycle; and  
(3) means for embedding said bit stream in said frames.

Claim 14

A DVD system, which includes a motor for rotating a disk, a pickup for reading and writing a signal on said disk, a drive circuit for controlling said motor and said pickup, a DVD control block for issuing a command to said drive circuit, a decoding block for performing signal conversion and error correction, an electronic watermark control block for embedding information or detecting embedded information, and an interface unit for communicating with an external device, said electronic watermark control block comprising:

- (1) means for accumulating values through observation of frames;
- (2) means for comparing the accumulated values through observation with threshold values that vary in accordance with said accumulated values; and
- (3) means for employing the comparison results to detect said embedded information.

Claim 15

The motion picture electronic watermark system according to claim 3, wherein said means (1) accumulates values through observation of frames, using a periodical detection mask that does not depend on relative positions, when information is embedded and when said information is detected.

Claim 16

The motion picture electronic watermark system according to claim 3, wherein said means (1) removes an overlapping positional relationship, using a history of a relative positional relationship between frames, when information is embedded and when said information is detected, so that a correlation existing among sequential frames is removed and values are accumulated through observation of said frames.

Claim 17

The motion picture electronic watermark system according to claim 3, wherein said means (1) uses multiple masks to embed and detect information, and (2) removes duplicate values obtained from the same mask, so that a correlation existing among sequential frames is removed and values are accumulated through observation of said frames.

Claim 18

The motion picture electronic watermark system according to claim 3, wherein said means (1) accumulates values through the observation of frames, separating first signals from signals for expressing information and employing signals that express information in the descending order of the intensities of said first signals.

Claim 19

The motion picture electronic watermark system according to claim 18, wherein said first signals are signals that express sign of said information.

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